Equipment List

Last modified on March 29, 2017

Table of Contents

Science On a Sphere® Hardware Specifications

We have tested out a limited set of system components that we know work with Science On a Sphere®. While other components may work, we can only guarantee a fully functional system that is built using these brands and models

Detailed Parts List

- Complete System -- Detailed Parts List (PDF)
- Complete System -- Detailed Parts List (XLS)

PC Specifications

DELL T5810 - Recommended Computer Specification. Two of these units are required, one operational and one for a hot spare. Each machine **requires** one additional third-party video cards from NVIDIA - the GeForce GTX 1070. See video card specifications for details.

Video Projector Specifications

SOS uses video projectors to display images onto a sphere, however not every projector is well suited for SOS. The system needs high quality, bright, long duty cycle projectors for proper system operation. Of extreme importance is the choice of the projector lens.

One of the projector characteristics we look at closely is brightness. While this is somewhat subjective, we have found that projectors need to produce a nominal 3500 ANSI LUMENs. This can vary depending on the ambient light conditions but 3500 LUMENs is the minimum -- many of our sites use 4000 LUMEN projectors.

The duty cycle of the projector is important for reliability. Since the projectors operate for 8 to 10 hours per day, often 7 days a week, the projectors need to be designed to run for that many hours. Generally, "board room" class projectors fit into this category. We find that these board room class projectors have the appropriate number of fans and filters to operate well in a museum environment.

As you might expect, the projector lens choice is critical. In most cases, the standard lens is usually adequate and always gives the best price. However the zoom and throw ranges need to be checked against the specifics of each sphere installation. The general rule of thumb used is that the projected image needs to be 72" in height at the distance given between the projector lens to the center of the sphere. We've used the "lens" calculator found at the web site, http://www.projectorcentral.com to checkout the throw/zoom ranges for a particular projector lens. Because this component is so critical, we request that each site check with NOAA before procuring a projector.

Here are a few projectors that we've used at other SOS installations and we have high confidence that they work properly with SOS within the distances listed below (again, the distance is measured from the projector lens to the center of the sphere). Other projectors will work, but we will only support projectors that have been pre-approved by NOAA.

- DLP (1920x1200 resolution, 4000 LUMENS)
  - Panasonic PT-DZ570u - standard zoom lens (14'2" - 28'3")
- DLP with Laser/LED Hybrid Lamp (1920x1080 resolution, 3500 LUMENS)
  - Panasonic PT-RZ470u or PT-RZ370u - standard zoom lens (15'7" - 31'3") - 20,000 lamp life

In order to mount the projector, it is recommended to buy a projector mount that allows for adjusting the

pitch, yaw, and height. The RPA series of projector mounts from Chief is customizable for every projector and works well for SOS. Make sure to order the RPA custom projector mount based on your projector selection, and not the universal projector mount. Also, we have found the RPA custom mount is better for our purposes than the RPA Elite custom mount, so don't order any of the Elite versions. For example, for the Panasonic PT-DZ570u, we recommend the RPA278 mount and for the Panasonic PT-RZ370 or 470, we recommend the RPA313 mount. Use the MountFinder on the righthand side of the Chief page to find the right custom RPA mount.

Video Card Specifications

Each SOS computer will have a total of **two** video cards installed. The original card that ships with the computer, the NVIDIA Quadro NVS 310, is used for the desktop and each computer needs one additional NVIDIA 3-D card which drives the SOS projectors that has to be purchased separately, for a total of two cards per computer, which means four cards for the whole system.

Therefore, we need a total of two additional NVIDIA 3-D video cards - one for the operational system, one for the spare. Each of these video cards has one DVI output, one HDMI output and three DisplayPort outputs. We use the three DisplayPort outputs and one HDMI output. **In order to use the four outputs, make sure to have the right cables.** If you are using HDMI extenders, you will need three DisplayPort to HDMI cables plus one HDMI to HDMI cable. If you are using DVI extenders, you will need three DisplayPort to DVI cables and one HDMI to DVI cable. We recommend the use of GTX 1070 video cards, which can be purchased from most online computer stores. We have found that some GTX 1070 video cards don't fit into the Dell 5810 due to the power input configuration. The card listed below has a configuration that does work with the Dell 5810. If you want to buy a different GTX 1070 video card, please check with us first.

- Newegg Link: EVGA GeForce GTX 1070 8Gb Video Card

Video Extenders

In order to connect the projectors to the SOS computer, we recommend the use of videos extenders. The extenders you use will vary depending on your projector selection. DVI or HDMI cables (depending on the extenders) are run from the SOS computer to four video extenders and then Cat6a ***(not Cat5e or Cat6)*** cables are run to the corresponding extenders positioned near each projector. Another DVI or HDMI cable is then used to connect the extender at the projector to the projector (unless you select projectors with built in extenders). As most extenders come with only one cable, make sure to have enough cables on hand to connect the extenders.

- Newegg Link: Gefen DVI Video Extender

The Panasonic PT-RZ370 or 470 projectors have a built in extender reciever, so you only need to use an extender sender at the computer. Here is the extender that we recommend using if you want to utilize the built in extender on the projector side:

- Amazon Link: Atlona HDMI Technologies Extender

**NOTE: If you use the built in extender, it can be used to power the projector on and off, so you don't need to run a second network cable to the projectors, as shown in the wiring diagram.

Audio System (Reference System)

Science On a Sphere requires an audio system, however there are numerous ways to build audio components. Here is one example of how to build an audio system for SOS. It includes a basic, 4 input,

mono mixer with four speakers. The speakers are two powered speakers and two un-powered slave speakers. The mixer is used to combine audio that comes from the SOS computer system and a wireless microphone. The shopping list for the reference system can be found here (SOS_Audio_Equipment.pdf). If the reference audio system is used, here is the suggested cabling layout.

For a higher-end audio installation, David Eltzroth has written a white paper discussing a Dolby stereo surround audio system for SOS.

Bluetooth Adapter

The Bluetooth adapter plugs into the main computer via USB and is required for the SOS software key. The following model is regularly used with Science On a Sphere:

- TRENDnet TBW-106UB

Apple iPad Remote Control

As of SOS release 3.4.2, SOS supports the Apple iPad and other iOS devices for sphere operations. For simplicity, we refer to this as the iPad interface, but it can be installed on a recent version of any the following devices:

- iPad
- iPad Mini
- iPod Touch
- iPhone

The iPad provides a richer interface with more information available to the user, but the iPod Touch and iPhone can be operated with one hand, which some users prefer. The free app is named "SOS Remote" and is available in the Apple App Store.

In addition to one of the above devices, the use of this interface requires Wi-Fi access to the SOS computer. There may be an existing Wi-Fi infrastructure at your site that you can use. If not, you will need to purchase an additional Wi-Fi router.

Further information about the iPad app, including Wi-Fi requirements, is available in the SOS Remote App Manual.